AHRQ Comparative Effectiveness Review Surveillance Program

CER # 30:

Comparative Effectiveness of Pain Management Interventions for Hip Fracture

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Surveillance Report 1st Assessment: March, 2012 Surveillance Report 2nd Assessment: October, 2012

Key Findings:

- There is sparse new literature on pain management interventions for hip fracture.
- Overall, expert opinion and review of the literature are consistent.

These findings were unchanged from the 1st assessment

Summary Decision

This CER's priority for updating is <u>Low</u> (This is unchanged from the last assessment)

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Effectiveness of Pain Management Interventions for Hip Fracture

1. Introduction

Comparative Effectiveness Review (CER) #30, Comparative Effectiveness of Pain Management Interventions for Hip Fracture was originally released in May 2011. It was therefore due for a surveillance assessment in November, 2011 and the first assessment of CER #30 was submitted in March, 2012. The second assessment was due to start the re-assessment in September, 2012 and was completed in October, 2012.

2. Methods

2.1 Literature Searches

Using the search strategy employed for the original report, we conducted a limited literature search of Medline. Initially, this search included five high-profile general medical interest journals (Annals of Internal Medicine, British Medical Journal, Journal of the American Medical Association, Lancet, and the New England Journal of Medicine) and six specialty journals (Osteoporosis International Journal, Journal of the American Geriatrics Society, Anesthesia and Analgesia, Regional Anesthesia and Pain Medication, Emergency Medicine, and Anesthesiology). The specialty journals were those most highly represented among the references for the original report. The search resulted in too little tiles to review. Thus, a full search was undertaken to ensure no relevant studies were missed. The first assessment search covered 2008 to November 10, 2011. The second assessment search covered 2011 to September 13, 2012. Appendix A includes the search strategy.

2.2 Study selection

In general we used the same inclusion and exclusion criteria as the original CER.

2.3 Expert Opinion

For the first assessment we shared the conclusions of the original report with 14 experts in the field including the original project leader, suggested field experts, original technical expert panel (TEP) members, and peer reviewers) for their assessment of the need to update the report and their recommendations of any relevant new studies; four subject matter experts completed the questionnaire matrix for the first assessment. For the second assessment, we reached out to the four experts with a modified matrix that included the experts prior responses. Three experts responded back. Appendix C shows the questionnaire matrix that was sent to the experts.

2.4 Check for qualitative and quantitative signals

After abstracting the study conditions and findings for each new included study into an evidence table, we assessed whether the new findings provided a signal according to the Ottawa Method and/or the RAND Method suggesting the need for an update. The criteria are listed in the table below.^{2, 3}

	Ottawa Method
	Ottawa Qualitative Criteria for Signals of Potentially Invalidating Changes in Evidence
A1	Opposing findings: A pivotal trial or systematic review (or guidelines) including at least one new trial that characterized the treatment in terms opposite to those used earlier.
A2	Substantial harm: A pivotal trial or systematic review (or guidelines) whose results called into question the use of the treatment based on evidence of harm or that did not proscribe use entirely but did potentially affect clinical decision making.
A3	A superior new treatment: A pivotal trial or systematic review (or guidelines) whose results identified another treatment as significantly superior to the one evaluated in the original review, based on efficacy or harm.
	Criteria for Signals of Major Changes in Evidence
A4	Important changes in effectiveness short of "opposing findings"
A5	Clinically important expansion of treatment
A6	Clinically important caveat
A7	Opposing findings from discordant meta-analysis or nonpivotal trial
	Quantitative Criteria for Signals of Potentially Invalidating Changes in Evidence
B1	A change in statistical significance (from nonsignificant to significant)
B2	A change in relative effect size of at least 50 percent
	RAND Method Indications for the Need for an Update
1	Original conclusion is still valid and this portion of the original report does not need updating
2	Original conclusion is possibly out of date and this portion of the original report may need updating
3	Original conclusion is probably out of date and this portion of the original report may need updating
4	Original conclusion is out of date

2.5 Compilation of Findings and Conclusions

For this assessment we constructed a summary table that included the key questions, the original conclusions, and the findings of the new literature search, the expert assessments, and any FDA reports that pertained to each key question. To assess the conclusions in terms of the evidence that they might need updating, we used the 4-category scheme described in the table above for the RAND Method.

In making the decision to classify a CER conclusion into one category or another, we used the following factors when making our assessments:

• If we found no new evidence or only confirmatory evidence and all responding experts assessed the CER conclusion as still valid, we classified the CER conclusion as still valid.

- If we found some new evidence that might change the CER conclusion, and /or a
 minority of responding experts assessed the CER conclusion as having new evidence that
 might change the conclusion, then we classified the CER conclusion as possibly out of
 date.
- If we found substantial new evidence that might change the CER conclusion, and/or a majority of responding experts assessed the CER conclusion as having new evidence that might change the conclusion, then we classified the CER conclusion as probably out of date.
- If we found new evidence that rendered the CER conclusion out of date or no longer applicable, we classified the CER conclusion as out of date. Recognizing that our literature searches were limited, we reserved this category only for situations where a limited search would produce prima facie evidence that a conclusion was out of date, such as the withdrawal of a drug or surgical device from the market, a black box warning from FDA, etc.

2.6 Determining Priority for Updating

We used the following two criteria in making our final conclusion for this CER:

- How much of the CER is possibly, probably, or certainly out of date?
- How out of date is that portion of the CER? For example, would the potential changes to the conclusions involve refinement of original estimates or do the potential changes mean some therapies are no longer favored or may not exist? Is the portion of the CER that is probably or certainly out of date an issue of safety (a drug withdrawn from the market, a black box warning) or the availability of a new drug within class (the latter being less of a signal to update than the former)?

3. Results

3.1 Search

1st assessment: The literature search identified 481 titles. After title and abstract review, we further reviewed the full text of 21 journal articles. The remaining 456 titles were rejected because they were editorials, letters, or did not include topics of interest. Four further articles were reviewed at the suggestion of the experts. Through literature searches and expert recommendations, 25 articles went on to full text review. Of these, 24 were rejected because they were non-systematic reviews, did not include a comparison of interest, or did not evaluate pain management in a population of people with a hip fracture. Thus, one article was abstracted into an evidence table (Appendix B).⁴ One technical expert provided a blanket "no new evidence, no need for updating" across the whole set of conclusions, and did not respond on a conclusion-byconclusion basis. Therefore, the table includes votes only for those 3 technical experts that did provide assessments on a conclusion-by-conclusion basis.

^{2&}lt;sup>nd</sup> assessment: 165 titles were identified from the literature searches covering 2011-September 13, 2012. We followed the same inclusion/exclusion criteria from the 1st assessment.

Four articles were accepted for full text review of which 2 were included for the re-assessment. 5,

The experts did not identify any new articles.

Appendix B includes the cumulative data for the 3 included studies.⁴⁻⁶ The two new studies are bolded.

3.2 Expert Opinion

2nd assessment: All three experts thought there was no new evidence for KQ's 1-4.

3.3 Identifying qualitative and quantitative signals

Table 1 shows the original key questions, the conclusions of the original report, the results of the literature and drug database searches, the experts' assessments, the recommendations of the Southern California Evidence-based Practice Center (SCEPC) regarding the need for update, and qualitative signal.

Table 1: Summary Table

Conclusions From CER Executive Summary	RAND Literature Search FDA/Health Canad MHRA (UK)		Conclusion from SCEPC	Conclusions of validity of CER conclusion(s)		
			Other Experts		Prior Assessment	Cumulative Assessment
SYSTEMIC ANALGESIA						
Three RCTs (n = 214)					Up-to-date	Up-to-date
evaluated different types						
of systemic analgesia. The						
mean age ranged from						
77.2 to 78.5 years; most						
patients were female.						
	anagement interven	tions for controlling acute		acture, what is the effectiveness of parture and chronic pain (up to 1 year Conclusion is still valid and this	· postfracture) c	ompared with
acute pain. Acute pain was	TWO HEW Uata.	140 Hew udla.	that this conclusion	portion of the CER does not need	Up-to-date	Up-to-date
measured using the 10cm	September 2012	September 2012	was almost certainly	updating.		
Visual Analogue Scale	assessment: No	assessment: No new	still supported by the	updating.		
(VAS); the mean baseline	new data.	data	evidence. One expert	September 2012 assessment:		
measure was 6.5cm. One	new unia.	uuu	thought there was	Conclusion unchanged from		
trial (n = 90) comparing			new evidence and	previous update.		
parecoxib intravenous (IV)			cited 2 distinct	previous upunie		
versus diclofenac			studies (but neither			
intramuscular (IM) ±			had results isolated in			
meperidine IM found a			populations of			
significant difference in			patients with a hip			
favor of parecoxib IV (MD			fracture)			
-0.70; 95% confidence			,			
interval [CI] -1.04, -0.36; p			September 2012			
<0.0001). The second trial			assessment: Three			
(n = 30) comparing			experts thought there			
intrathecal isotonic			was no new data.			
clonidine versus						
intrathecal hypertonic						
clonidine reported a						
significant difference in						
favor of isotonic clonidine						
(MD -1.69; 95% CI -2.01,						
-1.37; p <0.00001). The						
third trial $(n = 94)$						
comparing lysine						
clonixinate versus						
metamizole found no						

significant difference (MD					
-0.43; 95% CI -1.30, 0.44;					
p = 0.33). The strength of					
the evidence was rated as					
insufficient.					
Key Question (KQ) 2: In ol	lder adults (≥50 years	a) admitted to the hospita	l following acute hip fra	acture, what is the effectiveness of p	harmacologic and/or
nonpharmacologic pain ma	anagement interventi	ons on other outcomes up	to 1 year postfracture	compared with usual care or other i	interventions in all settings?
Other outcomes include:					
a. Mortality (30-day and up	p to 1 year postfractu	re)			
b. Functional status					
c. Pain medication use; cha	inge in type and quan	tity			
d. Mental status					

- e. Health-related quality of life
- f. Quality of sleep in the hospital
- g. Ability to participate in rehabilitation
- h. Return to prefracture living arrangements
- i. Health services utilization

L	1. Hearth Services utilization	1					
	Additional pain medication use was reported in one	No new data.	No new data.	Three experts agreed that this conclusion	Conclusion is still valid and this portion of the CER does not need	Up-to-date	Up-to-date
	trial comparing lysine	September 2012	September 2012	was almost certainly	updating.		
	clonixinate versus	assessment: No	assessment: No new	still supported by the			
	metamizole and reported	new data.	data.	evidence.			
	no significant difference						
	between groups (OR 3.00;			September 2012			
	95% CI 0.30, 29.94; p =			assessment: Three			
	0.35). <i>Delirium</i> was			experts thought there			
	reported in one trial			was no new data.			
	comparing lysine						
	clonixinate versus						
	metamizole and found no						
	significant difference (OR						
	0.96; 95% CI 0.06, 15.77;						
	p = 0.98). The strength of						
	the evidence was						
	rated as insufficient.						

Key Question (KQ 3): In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings?

One trial comparing lysine	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
clonixinate versus			that this conclusion	portion of the CER does not need		
metamizole reported the	September 2012	September 2012	was almost certainly	updating.		
number of	assessment: No	assessment: No new	still supported by the			
participants with any	new data.	data.	evidence.			
adverse event and found a						

significant difference in favor of metamizole (OR 3.50; 95% CI 1.04, 11.81; p = 0.04). Similarly, fewer patients in the metamizole group reported any gastrointestinal disturbance (OR 11.84; 95% CI 1.45, 96.75; p = 0.02). The remaining reported adverse effects were from single studies and did not demonstrate			September 2012 assessment: Three experts thought there was no new data.			
any significant statistical						
differences between the						
pain management interventions.						
	der adults (>50 years)	admitted to the hospital	l following acute hin fra	cture, how do the effectiveness and	safety of nharm	acologic and
				cute hip fracture up to 1 year after f		
care or other interventions				F	F	
No data were reported.	Ü		Three experts agreed that this conclusion was almost certainly still supported by the evidence. September 2012 assessment: Three experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
ANESTHESIA						
Twenty-one RCTs and one nRCT (n = 1,062) evaluated anesthesia including neuraxial (i.e., continuous vs. single administration) or neuraxial versus general anesthesia, or another form of anesthesia (i.e., spinal or regional); sample sizes ranged from 20 to 90. Additionally, eight cohort studies (n = 3,086)					Up-to-date	Up-to-date

provided additional data.		
The mean age of		
participants ranged		
from 70 to 86 years; most		
were female. Acute pain		
was measured using		
different scales (numeric		
rating score [1–5] and		
10cm VAS). The studies		
were grouped as		
follows: spinal versus		
epidural or general		
anesthesia (n = 10);		
neuraxial anesthesia:		
addition of clonidine,		
fentanyl, meperidine,		
morphine, or sufentanil (n		
= 14); neuraxial		
anesthesia: different doses		
or modes of administration		
(continuous vs. single		
administration) (n = 13).		
Key Question (KQ) 1: In older adults (≥50 years) admitted to the hospital fol		=
nonpharmacologic pain management interventions for controlling acute (up	to 30 days postfracture) and chronic pain (up to 1 year p	ostfracture) compared with

usual care or other interventions in all settings?

The average baseline VAS	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
pain score was 4.7.			that this conclusion	portion of the CER does not need		
Spinal versus general	September 2012	September 2012	was almost certainly	updating.		
anesthesia. One RCT (n =	assessment: No	assessment: No new	still supported by the			
30) reported a statistically	new data.	data.	evidence. One expert			
significant difference of			cited 4 articles with			
additional pain relief in			new evidence (none			
favor of spinal anesthesia			had results isolated in			
(MD = -0.86; 95% CI -			populations of			
1.30, -0.42 ; $p = 0.0001$).			patients with a hip			
The strength of the			fracture).			
evidence was rated as						
insufficient.			September 2012			
Neuraxial anesthesia:			assessment: Three			
addition of clonidine,			experts thought there			
fentanyl, meperidine,			was no new data			
morphine, or sufentanil.						
Three RCTs compared						
additional fentanyl (n =						
40), morphine						

(n = 40), and sufentanil (n						
= 50) versus standard						
spinal anesthesia. In the						
studies comparing the						
addition of fentanyl or						
sufentanil, no patients						
reported feeling pain						
following the procedure. In						
the study comparing the						
addition of morphine, there						
was no significant						
difference between groups						
(MD = -0.36; 95% CI -						
1.11, 0.39; p = 0.35). One						
RCT and one nRCT (n =						
80)						
comparing additional						
fentanyl reported acute						
pain on day 1 and found no						
significant difference						
between groups (OR 1.24;						
95% CI 0.34, 4.48; p =						
0.75). The						
strength of the evidence						
was rated as insufficient.						
Very Organian (VO) 1. In al	don adulta (SEO vicen	a) admitted to the begnite	l fallarring agusta hin fu	satures what is the affectiveness of n	haumaaalagia an	d/on

Key Question (KQ) 2: In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

- a. Mortality (30-day and up to 1 year postfracture)
- b. Functional status
- c. Pain medication use; change in type and quantity
- d. Mental status
- e. Health-related quality of life
- f. Quality of sleep in the hospital
- g. Ability to participate in rehabilitation
- h. Return to prefracture living arrangements
- i. Health services utilization

Spinal versus general	No new data.	No new data.	Two experts agreed	Conclusion is possibly out of date	Up-to-date	Up-to-date
anesthesia or spinal versus			that this conclusion	and this portion of the CER may		
epidural anesthesia. Two	September 2012	September 2012	was almost certainly	need updating.		
RCTs reported 30-day	assessment: In	assessment: No new	still supported by the			
mortality $(n = 99)$ and	one large	data.	evidence. One expert			
found no statistically	retrospective		thought there was			
significant difference in	cohort study,		new evidence and			
mortality rates (OR 1.73;	regional		cited 2 distinct			

95% CI 0.53, 5.68; p = 0.36). In two cohort studies (n = 650), pooling was not performed due to marked statistical heterogeneity and conflicting results between the studies. The strength of the evidence was rated as insufficient. In one RCT (n = 30) that reported <i>delirium</i> there was no significant difference between groups (OR 0.76; 95% CI 0.18, 3.24; p = 0.71). The strength of the evidence was rated as insufficient.	anesthesia was associated with a lower adjusted odds ratio of mortality (OR=0.710; p=0.014) and pulmonary complications (OR=0.752; p=<0.0001) relative to general anesthesia. ⁶ In one retrospective cohort study, inhospital mortality rates and rates of readmission were not statistically different between the grouper receiving regional anesthesia compared with general anesthesia ⁵		studies (but neither had results isolated in populations of patients with a hip fracture). September 2012 assessment: Three experts thought there was no new data.			
Length of stay (LOS) for acute hospitalization was reported in two RCTs (n = 99). LOS was significantly less in the general anesthesia group (MD 1.69; 95% CI 0.38, 3.01; p = 0.01).	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Three experts agreed that this conclusion was almost certainly still supported by the evidence. September 2012 assessment: Three experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
Neuraxial anesthesia: addition of clonidine, fentanyl,meperidine, morphine, or sufentanil.	No new data. September 2012 assessment: No	No new data. September 2012 assessment: No new	Three experts agreed that this conclusion was almost certainly still supported by the	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date

Additional pain medication	new data.	data.	evidence.			
use was reported in six	, uuu.	www.	ovidence.			
RCTs. In one RCT			September 2012			
(n = 40) comparing the			assessment: Three			
addition of lonidine versus			experts thought there			
standard spinal anesthesia,			was no new data.			
			was no new aaia.			
all participants required						
additional pain medication.						
The pooled estimate from						
three trials examining the						
addition of fentanyl (n =						
102) showed no significant						
difference between groups						
(OR 5.51; 95% CI 0.25,						
122.08; $p = 0.28$). There						
was no						
significant difference in						
additional pain medication						
use in one RCT $(n = 40)$						
that compared the addition						
of morphine (OR 0.27;						
95% CI 0.07, 1.04; p =						
0.06).						
Similarly, three RCTs (n =						
132) that compared the						
addition of sufentanil						
found no difference						
between groups (Peto's						
OR 7.39; 95% CI 0.15,						
372.38; p = 0.32).						
Delirium was reported in	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
one RCT $(n = 40)$			that this conclusion	portion of the CER does not need		
comparing the addition of	September 2012	September 2012	was almost certainly	updating.		
morphine and found no	assessment: No	assessment: No new	still supported by the			
significant difference	new data.	data.	evidence.			
between groups (OR 3.15;						
95% CI 0.12, 82.16; p =			September 2012			
0.49). The strength of the			assessment: Three			
evidence was rated as			experts thought there			
insufficient.			was no new data.			
Neuraxial anesthesia:	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
different doses and modes			that this conclusion	portion of the CER does not need		
of administration	September 2012	September 2012	was almost certainly	updating.		
(continuous vs. single	assessment: No	assessment: No new	still supported by the			
administration).	new data.	data.	evidence.			

Three RCTs (n = 163) reported 30-day mortality. In two, there were no deaths. In the third, there was no significant difference between groups (OR 0.46; 95% CI 0.07, 3.02; p = 0.42). Additionally, 30-day mortality was reported in one cohort study (n = 291) that found no significant difference between groups (OR 0.96; 95% CI 0.30, 3.00; p = 0.94). The strength of the evidence was rated as low.			September 2012 assessment: Three experts thought there was no new data.			
Additional pain medication use was reported in two RCTs (n = 134); there were no events in either group.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Three experts agreed that this conclusion was almost certainly still supported by the evidence. September 2012 assessment: Two experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
LOS for acute hospitalization was reported in two RCTs (n = 89). There was no significant difference between groups (MD = 0.98; 95% CI -2.06, 0.10; p = 0.07). In two RCTs (n = 134) that reported delirium, there was no significant difference between groups (OR 1.27; 95% CI 0.32, 4.99; p = 0.73). The strength of the evidence was rated as low.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Three experts agreed that this conclusion was almost certainly still supported by the evidence. September 2012 assessment: Three experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
Spinal anesthesia	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	1	

(different doses). One			that this conclusion	portion of the CER does not need		
cohort study ($n = 182$)	September 2012	September 2012	was almost certainly	updating.		
reported that there was no	assessment: No	assessment: No new	still supported by the			
significant difference in	new data.	data.	evidence.			
30-day mortality rates						
between groups (OR 0.49;			September 2012			
95% CI 0.12, 2.02; p =			assessment: Two			
0.32). The strength of the			experst thought there			
evidence was rated as			was no new data.			
insufficient. Another			One expert did not			
cohort study $(n = 60)$			know.			
reported no significant						
difference in the incidence						
of delirium (OR 0.46; 95%						
CI 0.08, 2.75).						
In one RCT $(n = 60)$ that	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
reported on additional			that this conclusion	portion of the CER does not need		
pain medication use, there	September 2012	September 2012	was almost certainly	updating.		
was no significant	assessment: No	assessment: No new	still supported by the			
difference between groups	new data.	data.	evidence.			
at different doses (4 vs.						
5mg, 4 vs. 6mg, or 5 vs.			September 2012			
6mg).			assessment: Three			
			experts thought there			
			was no new data.			

Key Question (KQ 3): In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings?

other meet ventions in an se	-			1		
Spinal versus general	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
anesthesia or spinal versus			that this conclusion	portion of the CER does not need		
epidural anesthesia. Two	September 2012	September 2012	was almost certainly	updating.		
RCTs $(n = 73)$ and one	assessment: No	assessment: No new	still supported by the			
cohort study $(n = 335)$	new data.	data.	evidence.			
reported						
adverse effects. Overall,			September 2012			
the RCTs reported no			assessment: Three			
significant differences in			experts thought there			
the occurrence of			was no new data.			
hypotension, myocardial						
infarction, or ST segment						
depression. The cohort						
study found no difference						
in the incidence of						
headaches and						

hypotension.						
Neuraxial anesthesia: addition of clonidine, fentanyl, meperidine, morphine, or sufentanil. Eleven RCTs and one nRCT (n = 490) provided data on adverse effects. a. Addition of clonidine. One trial (n = 40) reported no damage to surrounding structures, headaches, or infections. b. Addition of fentanyl. There was no significant difference in the number of participants reporting an allergic reaction in four RCTs (n = 164). There was no significant difference in the number of participants reporting bradycardia in one RCT 6 (n = 42). Seven trials (n = 284) reported the frequency of hypotension. Results were inconsistent across studies and the pooled results are not reported due to high heterogeneity. Five trials (n = 204) reported nausea or vomiting and found no significant difference between groups (OR 1.10; 95% CI 0.06, 20.73; p = 0.95). There were no reports of	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Three experts agreed that this conclusion was almost certainly still supported by the evidence. September 2012 assessment: Three experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
0.95). There						

(n = 140); and no reports						
of <i>headaches</i> in one trial						
(n = 40).						
c. Addition of meperidine.						
There were no reports of						
headaches in one RCT (n						
= 34).						
d. Addition of morphine.						
One RCT $(n = 40)$ reported						
no significant difference in						
the number of participants						
reporting allergic						
reactions, gastrointestinal						
symptoms, or nausea or						
vomiting.						
e. Addition of sufentanil.						
There was no significant						
difference in the incidence						
of <i>bradycardia</i> in one trial.						
Three trials $(n = 132)$						
reported a significantly						
lower incidence of						
hypotension in participants						
receiving sufentanil (OR =						
0.05; 95% CI 0.01, 0.34).						
In one RCT $(n = 42)$ there						
were no reports of allergic						
reaction, nausea or						
vomiting, or respiratory						
distress.						
Neuraxial anesthesia:	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
different modes of			that this conclusion	portion of the CER does not need	1	
administration.	September 2012	September 2012	was almost certainly	updating.		
In one cohort study (n =	assessment: No	assessment: No new	still supported by the	.1 8		
291), there were no reports	new data.	data.	evidence.			
of adverse effects. In one						
RCT ($n = 60$) there was no			September 2012			
significant difference in			assessment: Three			
the occurrence of			experts thought there			
gastrointestinal symptoms.			was no new data.			
In two trials $(n = 103)$ that						
reported on hypotension						
there was a significant						
difference between groups						
in favor of continuous						

spinal anesthesia (OR 0.12; 95% CI 0.03, 0.51; p = 0.004). Similarly, in one cohort study (n = 291) there was a statistically significant difference in favor of continuous spinal anesthesia (OR 0.08; 95% CI 0.04, 0.14; p < 0.00001). There was no significant difference in myocardial infarction in one trial (n = 29). There was no significant difference in the occurrence ST depression in one trial (n = 29). In one RCT (n = 74) there were no reports of bradycardia, myocardial						
ischemia, or stroke, and no reports of headache in one trial $(n = 60)$ or one cohort study $(n = 291)$.						
Neuraxial anesthesia: different doses. In one cohort study (n = 182), there were no reports of adverse effects. In one RCT (n = 60) there was no significant difference in the occurrence of allergic reaction for the different doses of bupivacaine. Bradycardia was reported in two trials (n = 120); there was no significant difference among the different doses of bupivacaine or levobupivacaine. Hypotension was reported in four RCTs (n = 190). There was a There was a	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert did not know. September 2012 assessment: Three experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date

significant difference			
following 4mg versus 6mg			
of bupivacaine (OR 0.03;			
95% CI 0.00, 0.58; p =			
0.02), but not 5 versus			
6mg of bupivacaine (OR			
0.31; 95% CI 0.08, 1.13; p			
= 0.08).			
Three cohort studies			
reported hypotension (n =			
267) and found a			
significant difference			
following 2.5mg versus			
5mg of bupivacaine (OR			
0.08; 95% CI 0.03, 0.23; p			
<0.00001), 4 versus 12mg			
of bupivacaine (OR 0.03;			
95% CI 0.01, 0.15; p			
<0.00001), and 0.125			
versus 0.5 percent of			
bupivacaine (OR 0.15;			
95% CI 0.03, 0.87; p =			
0.03). One cohort study			
reported a significant			
difference in the incidence			
of hypotension following			
4mg versus 12mg (OR			
0.03; 95% CI 0.01, 0.15;			
p <0.00001), but no			
difference in the incidence			
of delirium. There were no			
reports of nausea or			
<i>vomiting</i> in two trials (n =			
100); no reports of			
residual sensory			
deficits or motor weakness,			
respiratory distress,			
sedation, or urinary			
retention in one RCT (n =			
60); no reports of			
gastrointestinal symptoms			
in two trials			
(n = 100); and no reports			
of <i>headache</i> in one cohort			
study (n = 182).			
J \ - /-	<u> </u>		

No data were reported.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
			September 2012 assessment: Two experts thought there was no new data. One expert did not know.			
COMPLIMENTARY AND	ALTERNATIVE MI	EDICINE		I		
Two RCTs (n = 98) evaluated the administration of CAM interventions versus no or sham intervention. The mean age ranged from 76.8 to 86.3 years; most were female. One trial (n = 38) compared acupressure versus sham control delivered preoperatively. Acute pain was measured using the 10cm VAS; the baseline measure was 6.5cm. The second trial (n = 60) compared the Jacobson relaxation technique (a two-step process of contracting and relaxing specific muscles) versus no intervention. Pain was					Up-to-date	Up-to-date

Key Question (KQ) 1: In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions for controlling acute (up to 30 days postfracture) and chronic pain (up to 1 year postfracture) compared with

usual care or other interve	ntions in all settings	?				
Acupressure reduced pain	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
versus a sham intervention			that this conclusion	portion of the CER does not need	_	_
(MD -3.01; 95% CI -4.53,	September 2012	September 2012	was almost certainly	updating.		
-1.49; p <0.0001).	assessment: No	assessment: No new	still supported by the			
Relaxation also showed a	new data.	data.	evidence. One expert			
reduction in pain versus no			did not know.			
relaxation (MD -1.10; 95%						
CI -1.43, -0.77; p			September 2012			
<0.00001). The strength of			assessment: Two			
the evidence was rated as			experts thought there			
insufficient.			was no new data.			
			One expert did not			
			know.			

Key Question (KQ) 2: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or

nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

- a. Mortality (30-day and up to 1 year postfracture)
- **b.** Functional status
- c. Pain medication use; change in type and quantity
- d. Mental status
- e. Health-related quality of life
- f. Quality of sleep in the hospital
- g. Ability to participate in rehabilitation
- h. Return to prefracture living arrangements
- i. Health services utilization

1. Health Sci vices utiliza	uon					
In the RCT that examined	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
relaxation, fewer patients			that this conclusion	portion of the CER does not need		
in the relaxation group	September 2012	September 2012	was almost certainly	updating.		
required additional pain	assessment: No	assessment: No new	still supported by the			
medication (e.g.,	new data.	data.	evidence. One expert			
meperidine or morphine)			did not know.			
versus the control group						
(MD -8.43; 95% CI -			September 2012			
15.11, -1.75 ; $p = 0.01$).			assessment: Three			
			experts thought there			
			was no new			
			data.data.			

Key Question (KQ 3): In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings?

3.7 1			-	~		
No data were reported.	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	∐n-to-date	Un-to-date

				portion of the CER does not need updating. acture, how do the effectiveness and		
nonpharmacologic pain ma care or other interventions		tions vary in differing sul	opopulations following ac	cute hip fracture up to 1 year after	fracture compa	red with usual
No data were reported.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Three experts agreed that this conclusion was almost certainly still supported by the evidence. September 2012 assessment: Three	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
			experts thought there			
MULTIMODAL PAIN MA	NAGEMENT		was no new data.			
Two cohort studies (n = 226) evaluated multimodal pain management versus standard care. These studies described the use of multiple pain management strategies (sequential or in parallel) as part of the clinical pathway for patients with hip fractures. The mean age was not reported; most participants were female. One study compared a formal postoperative protocol of IV and oral tramadol plus					Up-to-date	Up-to-date

	T		T		1	1
acetaminophen						
versus standard care. The						
second compared a formal						
preoperative protocol of						
skin traction, morphine						
and acetaminophen versus						
standard care.						
	lder adults (>50 vea	rs) admitted to the hosnit	tal following acute hin fra	acture, what is the effectiveness of p	harmacologic ar	d/or
				ture) and chronic pain (up to 1 year		
usual care or other interve			c (up to 50 days postifact	ture) and emome pain (up to 1 year	postiracture) co	inparca with
No data were reported.	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
No data were reported.	140 new data.	No new data.	that this conclusion	portion of the CER does not need	Ор-то-чате	Ор-то-чате
	September 2012	September 2012	was almost certainly	updating.		
	assessment: No	assessment: No new		updating.		
			still supported by the			
	new data.	data.	evidence. One expert			
			cited 1 article (which			
			was not in a			
			population of people			
			with a hip fracture).			
			September 2012			
			assessment: Three			
			experts thought there			
			was no new data.			
Key Question (KQ) 2: In o	lder adults (≥50 year	rs) admitted to the hospit	tal following acute hip fra	acture, what is the effectiveness of p	harmacologic an	ıd/or
nonpharmacologic pain ma	anagement intervent	tions on other outcomes u	ip to 1 year postfracture	compared with usual care or other	interventions in	all settings?
Other outcomes include:						
a. Mortality (30-day and up	p to 1 year postfract	ure)				
b. Functional status		,				
c. Pain medication use; cha	ange in type and qua	ntity				
d. Mental status	8\JF 1					
e. Health-related quality of	f life					
f. Quality of sleep in the ho						
g. Ability to participate in						
h. Return to prefracture liv						
i. Health services utilization						
Mortality was reported in	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
one study ($n = 106$). There	1 to new data.	1.0 new data.	that this conclusion	portion of the CER does not need	ор-ю-чан	Op-to-date
was no significant	September 2012	September 2012	was almost certainly	updating.		
difference	assessment: No	assessment: No new	still supported by the	apaamg.		
between groups after 30	new data.	data.	evidence.			
days (OR 0.54; 95% CI			G 1 2012			
0.16, 1.77; p = 0.31), or at			September 2012			
1 year (OR 0.60; 95% CI			assessment: Two			

0.25, 1.47; p = 0.26). Both			experts thought there			
studies reported <i>delirium</i>			was no new data.			
and found no significant			One expert did not			
difference between groups.			know.			
The			know.			
strength of the evidence						
for both outcomes was						
rated as insufficient.						
	lder adults (>50 vea	rs) admitted to the hosnit	al following acute hin fr	acture, what is the nature and frequ	ency of adverse ef	fects that are
				nterventions up to 1 year postfractu		
other interventions in all se		orogic una nonpharmacor	ogie pum munugement n	neer ventions up to 1 year postifueta	re compared with	usuur cure or
Data were reported in one	9		Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
study (n = 106). There			that this conclusion	portion of the CER does not need	- F	P
were no significant			was almost certainly	updating.		
differences between			still supported by the			
groups.			evidence.			
			September 2012			
			assessment: Three			
			experts thought there			
			was no new data.	acture, how do the effectiveness and		
care or other interventions				cute hip fracture up to 1 year after	_	
No data were reported.	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
			that this conclusion	portion of the CER does not need		
	September 2012	September 2012	was almost certainly	updating.		
	assessment: No	assessment: No new	still supported by the			
	new data.	data.	evidence.			
			G . 1 2012			
			September 2012			
			assessment: Three			
			experts thought there			
AUDITE DI OCKE			was no new data.			
NERVE BLOCKS					IIn to data	IIn to Jete
Twenty-nine RCTs (n = 1,757) evaluated nerve					Up-to-date	Up-to-date
blocks, including 3-in-1						
(neurostimulation						
[NS]/ultrasoundguided						
[US]), combined						
lumbar/sacral plexus,						
fascia iliaca compartment,						
femoral, lumbar plexus						
remoral, lamour pickus	1				1	

plus sciatic nerve,						
posterior lumbar plexus,						
psoas compartment,						
obutarator, and epidural						
nerve blocks. These were						
compared with						
placebo/standard care, or a						
different method of nerve						
blocks. Additionally, three						
cohort studies ($n = 696$)						
evaluated 3-in-1, femoral,						
and lumbar						
plexus plus sciatic nerve						
blocks versus analgesia, or						
comparing different						
analgesic medications in						
femoral lumbar plexus						
plus sciatic blocks. The						
mean age of participants						
ranged from 59.2 to 85.9						
years; most were						
female. Acute pain was						
measured using different						
scales (i.e., numeric rating						
scales and 10cm VAS).						
Eight studies using the						
VAS reported mean						
baseline scores from 1.4cm						
to 7.3cm. The studies were						
grouped as follows: nerve						
blocks versus standard						
care/placebo; nerve blocks						
versus neuraxial						
anesthesia; nerve blocks–						
ropivacaine versus						
bupivacaine; nerve blocks–						
addition of clonidine; and						
nerve blocks						
	der adults (>50 vears	a) admitted to the hospita	l following scute hin fr	 acture, what is the effectiveness of p	harmacologic and/	or
				ture) and chronic pain (up to 1 year		
usual care or other interven			(up to 50 days postifact	one, and emonic pain (up to 1 year	postifucture, com	Jui ou Willi
Nerve blocks versus no	Chang (886)	No new data.	Two experts agreed	Conclusion is possibly out of date	Up-to-date	Up-to-date
block. Acute pain was	reported an	1.0 new data.	that this conclusion	and this portion of the CER may	Sp-w-uait	Op-to-trate
reported in 13 RCTs (n =	observational	September 2012	was almost certainly	need updating.		
942). There was significant	study in a letter to	assessment: No new	still supported by the	need apating.		
	study III a ICHCI lO	assessinent. Ho new	sum supported by the		I	i e

heterogeneity between the	the editor on	data.	evidence. One expert			
study results (I2 = 92	continuous	uuu.	cited 4 articles (none			
percent) and so pooled	femoral nerve		of which were in a			
results are not reported.	block infusion		population with a hip			
Even so, subgroup	(n=4) vs no nerve		fracture).			
analyses showed	block (n=12).		macture).			
significant results in favor	There was		September 2012			
of individual nerve blocks,	significantly lower		assessment: Three			
*	, ,					
except 3-in-1 block. Also	incidence of pain		experts thought there			
preoperative nerve blocks	on movement or		was no new data.			
seemed to be more	transfer in the					
effective than	nerve block group					
postoperative	compared to the					
administration. One trial (n	no nerve block					
= 50) reported a significant	group on day 4					
difference in postoperative	(p=0.045).					
pain on day 1 favoring						
nerve blocks (OR 0.10;	September 2012					
95% CI 0.03, 0.36; p =	assessment: No					
0.0005). The strength of	new data.					
the evidence was rated as						
moderate.						
Nerve blocks versus	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
neuraxial anesthesia.			that this conclusion	portion of the CER does not need		
Acute pain was reported in	September 2012	September 2012	was almost certainly	updating.		
three RCTs ($n = 109$).	assessment: No	assessment: No new	still supported by the			
There was no significant	new data.	data.	evidence. One expert			
difference between groups			did not know.			
(MD -0.35; 95% CI -1.10,						
0.39; $p = 0.35$). The			September 2012			
strength of the evidence			assessment: Three			
						1
was rated as low.			experts thought there			

Key Question (KQ) 2: In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

- a. Mortality (30-day and up to 1 year postfracture)
- b. Functional status
- c. Pain medication use; change in type and quantity
- d. Mental status
- e. Health-related quality of life
- f. Quality of sleep in the hospital
- g. Ability to participate in rehabilitation
- h. Return to prefracture living arrangements
- i. Health services utilization

Nerve blocks versus no	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	
block.	140 new data.	140 new data.	that this conclusion	portion of the CER does not need	
Four RCTs (n = 228)	September 2012	September 2012	was almost certainly	updating.	
evaluated 30-day	assessment: No	assessment: No new	still supported by the	updating.	
mortality; there was no	new data.	data.	evidence. One expert		
significant difference	new aaa.	uuu.	did not know.		
between groups (OR 0.28;			did not know.		
95% CI 0.07, 1.12; p =			September 2012		
0.07). The strength of the			assessment: Three		
evidence was rated as low.			experts thought there		
There was no significant			was no new data.		
difference in 1-year			was no new aata.		
mortality in two RCTs (n =					
112) (OR 0.82; 95% CI					
0.25, 2.72; p = 0.74), or in					
one cohort study (n = 535)					
(OR 0.73 ; 95% CI 0.48 ,					
1.10;					
p = 0.14). Seven RCTs (n					
= 378) evaluated					
additional pain medication					
use and found a significant					
difference favoring nerve					
blocks (OR 0.32; 95% CI					
0.14, 0.72; p = 0.006).					
Similarly, one cohort study					
(n = 99)					
reported a significant					
difference favoring nerve					
blocks (OR 0.03; 95% CI					
0.00, 0.44; p = 0.01).					
Pooled results for four					
RCTs $(n = 461)$ and two					
cohort studies $(n = 634)$					
that provided data on					
delirium showed a					
significant difference					
favoring nerve blocks (OR					
0.33; 95% CI 0.16, 0.66; p					
= 0.002 [RCTs]; OR 0.24;					
95% CI 0.08, 0.72; p =					
0.01[cohort studies]). The					
strength of the evidence					
was rated as moderate.					
LOS for acute					

hospitalization (days) was reported in two cohort studies (n = 634), but the pooled results are not reported due to marked heterogeneity between the original study results. Quality of sleep was reported in one RCT (n = 77) that found no significant difference (MD 0.30; 95% CI -0.46, 1.06; p = 0.44). Nerve blocks versus neuraxial anesthesia. Additional pain medication use was reported in one RCT (n=30); there was no significant difference between groups (OR 2.00; 95% CI 0.38, 10.51; p = 0.41). Delirium was reported in one RCT (n = 29); there was no significant difference between groups (OR 1.20; 95% CI 0.27, 5.40; p = 0.81). The strength of the evidence was rated as insufficient.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert did not know. September 2012 assessment: Two experts thought there was no new data. One expert did not know.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
Ropivacaine versus bupivacaine. Additional pain medication use and delirium were reported in one cohort study (n=62). There was no significant difference between groups for either outcome (OR 1.25; 95% CI 0.42, 3.76; p=0.69; OR 1.93; 95% CI 0.17, 22.50; p=0.60, respectively). The strength of the evidence for delirium was rated as insufficient.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert did not know. September 2012 assessment: Two experts thought there was no new data. One expert did not know.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date

Key Question (KQ 3): In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings? Nerve blocks versus no No new data. No new data. block. Respiratory infection was September 2012 September 2012 reported in five RCTs assessment: No assessment: No new (n=268) and found no new data. data. significant difference (OR 0.43; 95% CI 0.18, 1.04; p=0.06). There were no significant differences between groups for the following adverse effects: cardiac complications (2 RCTs, n=128; 1 cohort study, n=99); damage to surrounding structures (3 RCTs, n=224); *deep* venous thrombosis (2 RCTs, n=100); *myocardial* infarction (2 RCTs, n=145; 1 cohort study, n=535); nausea/vomiting (6 RCTs, n = 421); *pulmonary* embolism (2 RCTs, n = 128); surgical wound infection (2 RCTs, n = 110); urinary retention (2 RCTs, n = 62; 1 cohort study, n = 535). There were no reports of infection in two RCTs (n = 184). The remaining reported adverse effects were from single studies and did not demonstrate any significant statistical differences between the pain management interventions. Nerve blocks versus No new data. Two experts agreed Conclusion is still valid and this No new data. Up-to-date Up-to-date that this conclusion portion of the CER does not need neuraxial anesthesia, ropivacaine versus September 2012 September 2012 was almost certainly updating.

bupivacaine and addition of clonidine. The reported adverse effects were from single studies and did not	assessment: No new data.	assessment: No new data.	still supported by the evidence. One expert did not know.			
demonstrate any			September 2012			
significant statistical			assessment: Two			
differences between the			experts thought there			
pain management			was no new data.			
interventions.			One expert did not			
			know.			
US versus NS. Two RCTs	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
(n = 100) reported no			that this conclusion	portion of the CER does not need		
significant difference in	September 2012	September 2012	was almost certainly	updating.		
damage to surrounding	assessment: No	assessment: No new	still supported by the			
structures (OR 0.16; 95%	new data.	data.	evidence. One expert			
CI 0.02 , 1.30 ; $p = 0.09$).			did not know.			
The remaining reported						
adverse effects were from			September 2012			
single			assessment: Two			
studies and did not			experts thought there			
demonstrate any			was no new data.			
significant statistical			One expert did not			
differences between the			know.			
pain management						
interventions.						

Key Question (KQ 4): In older adults (≥50 years) admitted to the hospital following acute hip fracture, how do the effectiveness and safety of pharmacologic and nonpharmacologic pain management interventions vary in differing subpopulations following acute hip fracture up to 1 year after fracture compared with usual care or other interventions in all settings?

cure of other miter ventions	in an seeings.					
One RCT recruited	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
patients with pre-existing			that this conclusion	portion of the CER does not need		
heart disease. There was a	September 2012	September 2012	was almost certainly	updating.		
significant reduction in	assessment: No	assessment: No new	still supported by the			
pain favoring nerve blocks	new data.	data.	evidence. One expert			
(MD -0.55; -0.81, -0.29; p			did not know.			
<0.0001). There was no						
significant difference in			September 2012			
30-day mortality (OR 0.10;			assessment: Two			
95% CI 0.01,			experts thought there			
1.90; $p = 0.12$) or adverse			was no new data.			
effects. One RCT recruited			One expert did not			
participants that were			know.			
independent prior to their						
hip fracture. There was no						
significant difference						

				T		
between nerve blocks						
versus standard care for						
30-day mortality						
(OR 1.00; 95% CI 0.06,						
16.76; p = 1.00).						
NEUROSTIMULATION						
Two RCTs ($n = 123$)					Up-to-date	Up-to-date
evaluated transcutaneous						
electrical neurostimulation						
(TENS) versus sham						
control. One trial						
administered the TENS						
preoperatively, and the						
other postoperatively. The						
mean age of participants						
ranged from 71.2 to 80.5						
years; most were female.						
Pain was measured using						
the VAS; the mean						
baseline measure was 8.4						
to 8.8.						
Key Question (KQ) 1: In o	lder adults (>50 yea	rs) admitted to the hospit	tal following acute hip fra	acture, what is the effectiveness of p	harmacologic and/	or
				ture) and chronic pain (up to 1 year		
usual care or other interve			(T	The Cartesian Control of the Control	.	L
Two RCTs (n = 123)	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
found a significant			that this conclusion	portion of the CER does not need	- L	F
difference in additional	September 2012	September 2012	was almost certainly	updating.		
pain relief in favor	assessment: No	assessment: No new	still supported by the	- T		
of TENS (MD -2.79; 95%	new data.	data.	evidence. One			
CI -4.95, -0.64; $p = 0.01$).			expert did not know.			
Pain on movement was			empere and morning wi			
reported in one trial (n =			September 2012			
60) and found a significant			assessment: Three			
difference in favor or			experts thought there			
TENS (MD -3.90; 95% CI			was no new data.			
-6.22, -1.58; p = 0.001).			mas no nen aua.			
-0.22, -1.36, p = 0.001). The						
strength of the evidence						
was rated as insufficient.						
	13		tal fallanda a contra la fin	adama andradia dha see sa' sa sa e	hammaaalii i	
Key Question (KQ) 2: In o	ouer aduits (≥50 yea	rs) admitted to the hospit	tal following acute hip fra	acture, what is the effectiveness of p	narmacologic and/	or

Key Question (KQ) 2: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

a. Mortality (30-day and up to 1 year postfracture)

b. Functional status

c. Pain medication use; change in type and quantity d. Mental status e. Health-related quality of life f. Quality of sleep in the hospital g. Ability to participate in rehabilitation h. Return to prefracture living arrangements i. Health services utilization One RCT (n = 60)No new data. No new data. Two experts agreed Conclusion is still valid and this Up-to-date Up-to-date provided data on healththat this conclusion portion of the CER does not need related quality of life September 2012 September 2012 was almost certainly updating. (HRQQL) and quality of assessment: No assessment: No new still supported by the sleep. TENS provided new data. evidence. One data. significant expert cited 1 article improvement in HRQOL (which was not in a (MD -4.30; 95% CI -6.86, population with a hip -1.74; p = 0.001) and fracture). quality of sleep (MD -3.60; 95% CI -575, -1.45; September 2012 p = 0.001). assessment: Two experts thought there was no new data. One expert did not know. Key Question (KQ 3): In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings? No data were reported. No new data. No new data. Two experts agreed Conclusion is still valid and this Up-to-date Up-to-date that this conclusion portion of the CER does not need September 2012 September 2012 was almost certainly updating. assessment: No assessment: No new still supported by the new data. data. evidence. One expert cited 1 article (which was not in a population with a hip fracture). September 2012 assessment: Three experts thought there was no new data.

nonpharmacologic pain management interventions vary in differing subpopulations following acute hip fracture up to 1 year after fracture compared with usual								
care or other interventions in all settings?								
No data were reported.	No new data.	No new data.	Three experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date		

Key Question (KQ 4): In older adults (≥50 years) admitted to the hospital following acute hip fracture, how do the effectiveness and safety of pharmacologic and

	September 2012 assessment: No new data.	September 2012 assessment: No new data.	that this conclusion was almost certainly still supported by the evidence.	portion of the CER does not need updating.		
			September 2012 assessment: Three experts thought there was no new data.			
REHABILITATION						
One RCT (n = 37) evaluated physical therapy (stretching and strengthening of spinal and psoas muscles) versus standard care. The mean age was 67.1; all participants were female. Pain was measured using the 10cm VAS; the mean baseline measure was 7.9cm.					Up-to-date	Up-to-date
	anagement intervent	ions for controlling acut		acture, what is the effectiveness of p ture) and chronic pain (up to 1 year		
There was a significant difference in additional pain relief following physical therapy (MD - 1.39; 95% CI -2.27, -0.51; p = 0.002). The strength of the evidence was rated as insufficient.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert did not know. September 2012 assessment: Two experts thought there was no new data. One expert did not know.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date

Key Question (KQ) 2: In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

- a. Mortality (30-day and up to 1 year postfracture)
- b. Functional status
- c. Pain medication use; change in type and quantity

d. Mental status e. Health-related quality f. Quality of sleep in the l g. Ability to participate in h. Return to prefracture i. Health services utilizati	nospital n rehabilitation living arrangements					
No other outcomes were reported.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert cited 2 articles (neither of which were in a population with a hip fracture). September 2012 assessment: Three experts thought there was no new data.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
directly or indirectly asso	ciated with pharmac			acture, what is the nature and frequ nterventions up to 1 year postfractu		
other interventions in all No data were reported.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
			September 2012 assessment: Three experts thought there was no new data.			
	nanagement intervent			acture, how do the effectiveness and cute hip fracture up to 1 year after		
All participants were female.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Three experts agreed that this conclusion was almost certainly still supported by the evidence.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
			September 2012 assessment: Three			

			experts thought there was no new data.			
TRACTION			<u>.</u>			
Nine RCTs, four nRCTs,					Up-to-date	Up-to-date
and one cohort study						
evaluated skin or skeletal						
traction versus no						
intervention or other						
interventions. Sample sizes						
ranged from 60 to 311.						
The mean age ranged from						
74.0 to						
81.0; most participants						
were female.						
				acture, what is the effectiveness of p		
			e (up to 30 days postfract	ture) and chronic pain (up to 1 year	postfracture) cor	npared with
usual care or other interve					т	
Acute pain was measured	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
using the 10cm VAS; the			that this conclusion	portion of the CER does not need		
mean baseline measure	September 2012	September 2012	was almost certainly	updating.		
ranged from 0.3 to 6.9cm.	assessment: No	assessment: No new	still supported by the			
Eight trials compared skin	new data.	data.	evidence. One expert			
traction ($n = 498$) versus			did not know.			
no traction						
(n = 594) and found no			September 2012			
significant difference			assessment: Two			
between groups. The			experts thought			
strength of the evidence			there was no new			
was rated as low. One trial			data. One expert did			
(n = 78) compared skin			not know.			
traction versus skeletal						
traction and found no						
difference between groups.						
The strength of the						
evidence was rated as						
insufficient.						

Key Question (KQ) 2: In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

- a. Mortality (30-day and up to 1 year postfracture)
- b. Functional status
- c. Pain medication use; change in type and quantity
- d. Mental status
- e. Health-related quality of life

f.	Ouality	of	sleep	in	the	hospital

- g. Ability to participate in rehabilitation
- h. Return to prefracture living arrangements
- i. Health services utilization

LOS for acute hospitalization was reported in two trials (n = 326) comparing skin traction versus no traction and no significant difference was found.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert did not know.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
Thirty-day mortality was reported in one RCT (n = 80) that found no difference between skin and skeletal traction versus			September 2012 assessment: Two experts thought there was no new data. One expert did			
no traction. Additional pain medication use was reported in one RCT and one nRCT (n = 352). There was no significant			not know.			
difference between groups.						

Key Question (KQ 3): In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings?

Seven RCTs ($n = 1,043$)	No new data.	No new data.	Two experts agreed	Conclusion is still valid and this	Up-to-date	Up-to-date
and one cohort study (n =			that this conclusion	portion of the CER does not need		•
134) provided data on	September 2012	September 2012	was almost certainly	updating.		
adverse effects. The	assessment: No	assessment: No new	still supported by the			
reported adverse effects	new data.	data.	evidence. One			
were from one to two			expert did not know.			
studies, and did not						
demonstrate any			September 2012			
significant statistical			assessment: Two			
differences between the			experts thought there			
pain management			was no new data.			
interventions.			One expert did not			

			know.			
	nanagement intervent			acture, how do the effectiveness and cute hip fracture up to 1 year after		
No data were reported.	No new data. September 2012 assessment: No new data.	No new data. September 2012 assessment: No new data.	Two experts agreed that this conclusion was almost certainly still supported by the evidence. One expert did not know.	Conclusion is still valid and this portion of the CER does not need updating.	Up-to-date	Up-to-date
			September 2012 assessment: Two experts thought there was no new data. One expert did not know.			

Legend: RCT = randomized control trial; nRCT = non-randomized control trial; LOS = length of stay; VAS = visual analog scale; MD = mean difference; CI = confidence intervals; OR = odds ratio

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Appendices

Appendix A: Search Methodology

Appendix B: Evidence Table

Appendix C: Questionnaire Matrix

Appendix A. Search Methodology

DATABASE SEARCHED & TIME PERIOD COVERED:

Medline on OVID – 2011-9/13/2012

LIMITERS:

English

Human

SEARCH STRATEGY:

exp "anesthesia and analgesia"/ or exp analgesia/ OR ((an?esthet\$ or an?esthesia) adj4 (regional\$ or local\$ or general or spinal or epidural)).mp. OR (block or analges*).mp.

AND

exp Hip Fractures/ OR ((intertrochanter* or petrochanter* or subtrochanter* or extracapsular or petrochant* or trochant* or hip or femoral neck) adj4 (hemiarthroplasty or fracture*)).mp. OR ("neck of femur" adj4 fractur*).mp.

OR

((pain* or discomfort* or ache* or aching or sore* or suffer*) adj3 (assess* or relief or reliev* or reduc* or treat* or manage* or control* or experience* or medicat* or duration or evaluat* or alleviat* or level or score* or subjective or felt or prevent* or duration or outcome* or heal or healing or therap* or recover* or "quality of life")).mp. OR exp Pain/rt, th, us, rh, dh, su, pc, dt OR pain postoperative/pc, th OR Pain Measurement/

AND

exp Hip Fractures/ OR ((intertrochanter* or petrochanter* or subtrochanter* or extracapsular or petrochant* or trochant* or hip or femoral neck) adj4 (hemiarthroplasty or fracture*)).mp. OR ("neck of femur" adj4 fractur*).mp.

OR

exp Pain/

AND

exp Hip Fractures/ OR ((intertrochanter* or petrochanter* or subtrochanter* or extracapsular or petrochant* or trochant* or hip or femoral neck) adj4 (hemiarthroplasty or fracture*)).mp. OR ("neck of femur" adj4 fractur*).mp.

OR

exp Therapeutics/ or exp "Outcome Assessment (Health Care)"/ or exp "Length of Stay"/ or "Quality of Life"/ or "functional outcome".ti,ab.

AND

exp Hip Fractures/rh, nu, th, dt, dh

AND

LIMITING TO THE FOLLOWING JOURNALS:

Annals of Internal Medicine

BMJ

JAMA Lancet

New England Journal of Medicine

Anesthesia & Analgesia Anesthesiology Emergency Medicine Journal of the American Geriatrics Society Osteoporosis International Regional Anesthesia & Pain Medicine

TOTAL NUMBER OF RESULTS: 165 NUMBER OF RESULTS WHEN LIMITED TO SPECIFIED JOURNALS: 22

DATABASE SEARCHED & TIME PERIOD COVERED:

Medline on OVID – 2008-11/10/2011

LIMITERS:

English

Human

SEARCH STRATEGY:

exp "anesthesia and analgesia"/ or exp analgesia/ OR ((an?esthet\$ or an?esthesia) adj4 (regional\$ or local\$ or general or spinal or epidural)).mp. OR (block or analges*).mp.

AND

exp Hip Fractures/ OR ((intertrochanter* or petrochanter* or subtrochanter* or extracapsular or petrochant* or trochant* or hip or femoral neck) adj4 (hemiarthroplasty or fracture*)).mp. OR ("neck of femur" adj4 fractur*).mp.

OR

((pain* or discomfort* or ache* or aching or sore* or suffer*) adj3 (assess* or relief or reliev* or reduc* or treat* or manage* or control* or experience* or medicat* or duration or evaluat* or alleviat* or level or score* or subjective or felt or prevent* or duration or outcome* or heal or healing or therap* or recover* or "quality of life")).mp. OR exp Pain/rt, th, us, rh, dh, su, pc, dt OR pain postoperative/pc, th OR Pain Measurement/

exp Hip Fractures/ OR ((intertrochanter* or petrochanter* or subtrochanter* or extracapsular or petrochant* or trochant* or hip or femoral neck) adj4 (hemiarthroplasty or fracture*)).mp. OR ("neck of femur" adj4 fractur*).mp.

OR

exp Pain/

AND

exp Hip Fractures/ OR ((intertrochanter* or petrochanter* or subtrochanter* or extracapsular or petrochant* or trochant* or hip or femoral neck) adj4 (hemiarthroplasty or fracture*)).mp. OR

("neck of femur" adj4 fractur*).mp.

OR

 $exp\ The rapeutics/\ or\ exp\ "Outcome\ Assessment\ (Health\ Care)"/\ or\ exp\ "Length\ of\ Stay"/\ or\ "Quality\ of\ Life"/\ or\ "functional\ outcome".ti,ab.$

AND

exp Hip Fractures/rh, nu, th, dt, dh

AND

LIMITING TO THE FOLLOWING JOURNALS:

Annals of Internal Medicine BMJ JAMA Lancet

New England Journal of Medicine

Anesthesia & Analgesia Anesthesiology Emergency Medicine Journal of the American Geriatrics Society Osteoporosis International Regional Anesthesia & Pain Medicine

TOTAL NUMBER OF RESULTS: 481 WITH REMOVAL OF DUPLICATES NUMBER OF RESULTS WHEN LIMITED TO SPECIFIED JOURNALS: 30

Appendix B. Evidence Table

Author, year	Trial	n	Subjects	Primary Outcome	Duration	Study Quality	Findings
Key Question (KQ) 1: In nonpharmacologic pain with usual care or other SYSTEMIC ANALGESIA No new data. ANESTHESIA No new data. COMPLIMENTARY ANALOGOMPLIMENTARY ANALO	management interver interventions in all so 4 No new data. No new data. DALTERNATIVE M. No new data.	tions for controlling ettings? No new data.					
MULTIMODAL PAIN M No new data. NERVE BLOCKS	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
Chang, 2011 ⁴	Observational study comparing the use of a femoral nerve block with no nerve block (and standard care)	n = 16 -Femoral nerve block: 4 -No nerve block: 12	Femoral nerve block: -Avg age: 71.3 (13) -Female: 4/4 No nerve block: -Avg age: 80.2 (6.6) -Female: 6/12	Acute pain	4 days	Poor	Lower incidence of pain on movement or transfer in the femoral nerve block group compared with the nonfemoral nerve block group on postblock day 4 (p=0.045)
NEUROSTIMULATION No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
REHABILITATION							
No new data. TRACTION	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.

Key Question (KQ) 2: In older adults (\geq 50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include:

- a. Mortality (30-day and up to 1 year postfracture)
- b. Functional status
- c. Pain medication use; change in type and quantity
- d. Mental status

Author, year	Trial	n	Subjects	Primary Outcome	Duration	Study Quality	Findings
e. Health-related quality f. Quality of sleep in the	hospital						
SYSTEMIC ANALGES				T .			
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
ANESTHESIA Neuman, 2012 ⁶	Retrospective cohort	Total: 18,158 General Anesthesia: 12,904 Regional Anesthesia: 5,254	General Anesthesia:median age 8226.4% male Regional Anesthesia:median age 8325.7% make	Inpatient mortality	Until hospital discharge	Good	Regional anesthesia was associated with a lower adjusted odds ratio of mortality (OR=0.710; p=0.014) and pulmonary complications (OR=0.752; p=<0.0001)
Le-Wendling, 2012 ⁵ (5744)	Retrospective cohort	Total: 308 General Anesthesia: 235 Regional Anesthesia: 73	General Anesthesia: 27% male Regional Anesthesia: 21% male	Morbidity, mortality, and hospitalization costs	Until hospital discharge	Good	relative to general anesthesia No statistically significant difference in postoperative morbidity, rates of hospitalization, in-patient mortality, or hospitalization costs in patients > 65 under going regional or general anesthesia
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
MULTIMODAL PAIN N		140 Hew data.	140 new data.	110 new data.	140 new data.	140 new data.	110 Hew data.
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
NERVE BLOCKS	110 new data.	110 new data.	110 new data.	110 Hew data.	110 new data.	110 new data.	1 to new data.

Author, year	Trial	n	Subjects	Primary Outcome	Duration	Study Quality	Findings
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
NEUROSTIMULAT	ION						
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
REHABILITATION							
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
TRACTION							
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
are directly or indire	(i): In older adults (≥50 yetly associated with phentions in all settings?						
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
ANESTHESIA	110 new data.	110 new data.	110 new data.	110 new data.	110 new data.	110 new data.	110 new data.
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
	AND ALTERNATIVE		110 110 11 011111	110 He W Gatas	110 110 11 0111111	1 to 110 to datas	110 He W Gatas
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
MULTIMODAL PAI						1 2 12 12 11 22 11	
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
NERVE BLOCKS							
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
NEUROSTIMULAT	ION		<u> </u>				
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
REHABILITATION			'				
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
TRACTION	-	<u> </u>					
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
and nonpharmacolo usual care or other i): In older adults (≥50 y gic pain management in nterventions in all settin	nterventions vary in d					
SYSTEMIC ANALG			T	T			T
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
ANESTHESIA						1	
No new data.	No new data. YAND ALTERNATIVE	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
MULTIMODAL PAI		110 new data.	110 new data.	110 new data.	110 new data.	140 new data.	110 new data.
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
	110 new data.	110 Hew data.	110 new data.	110 He ii data.	110 Hew data.	110 new data.	110 He W data.
NERVE BLOCKS							1
NERVE BLOCKS No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.

Author, year	Trial	n	Subjects	Primary Outcome	Duration	Study Quality	Findings
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
REHABILITATION							
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.
TRACTION			<u> </u>			•	
No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.	No new data.

Avg = average; OR = odds ratio

Appendix C. Questionnaire Matrix

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
Systemic Analgesia			
Three RCTs (n = 214) evaluated different types of systemic analgesia. The mean age ranged from 77.2 to 78.5 years; most patients were female.		New Evidence:	
	ventions for controlling acute (up to 3	ving acute hip fracture, what is the effectivenes 30 days postfracture) and chronic pain (up to 1	
All three trials reported acute pain. Acute pain was measured using the 10cm Visual Analogue Scale (VAS); the mean baseline measure was 6.5cm. One trial (n = 90) comparing parecoxib intravenous (IV) versus diclofenac intramuscular (IM) ± meperidine IM found a significant difference in favor of parecoxib IV (MD -0.70; 95% confidence interval [CI] -1.04, -0.36; p <0.0001). The second trial (n = 30) comparing intrathecal isotonic clonidine versus intrathecal hypertonic clonidine reported a significant difference in favor of isotonic clonidine (MD -1.69; 95% CI - 2.01, -1.37; p <0.00001). The third trial (n = 94) comparing lysine clonixinate versus metamizole found no significant difference (MD -0.43; 95% CI -1.30, 0.44; p = 0.33). The strength of the evidence was rated as		New Evidence:	

Conclusions From CER Executive Summary insufficient.	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
	ventions on other outcomes up to 1 year	ring acute hip fracture, what is the effectiveness ear postfracture compared with usual care or o	
h. Return to prefracture living arrangementi. Health services utilization	nts		
Additional pain medication use was reported in one trial comparing lysine clonixinate versus metamizole and reported no significant difference between groups (OR 3.00; 95% CI 0.30, 29.94; p = 0.35). Delirium was reported in one trial comparing lysine clonixinate versus metamizole and found no significant difference (OR 0.96; 95% CI 0.06, 15.77; p = 0.98). The strength of the evidence was rated as insufficient.		New Evidence:	
		ring acute hip fracture, what is the nature and f n management interventions up to 1 year postfr	
One trial comparing lysine clonixinate versus metamizole reported the number of participants with <i>any adverse event</i> and found a significant difference in favor of		New Evidence:	

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
metamizole (OR 3.50; 95% CI 1.04, 11.81; p = 0.04). Similarly, fewer patients in the metamizole group reported any gastrointestinal disturbance (OR 11.84; 95% CI 1.45, 96.75; p = 0.02). The remaining reported adverse effects were from single studies and did not demonstrate any significant statistical differences between the pain management interventions.			
		ving acute hip fracture, how do the effectivenes tions following acute hip fracture up to 1 year a	
No data were reported.		New Evidence:	
<u>Anesthesia</u>			
Twenty-one RCTs and one nRCT (n = 1,062) evaluated anesthesia including neuraxial (i.e., continuous vs. single administration) or neuraxial versus general anesthesia, or another form of anesthesia (i.e., spinal or regional); sample sizes ranged from 20 to 90. Additionally, eight cohort studies (n = 3,086) provided additional data. The mean age of participants ranged		New Evidence:	

Conclusions From	Is this conclusion almost certainly still	Has there been new	
CER Executive	supported by the	evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
from 70 to 86 years; most were female. Acute pain was measured using different scales (numeric rating score [1–5] and 10cm VAS). The studies were grouped as follows: spinal versus epidural or general anesthesia (n = 10); neuraxial anesthesia: addition of clonidine, fentanyl, meperidine, morphine, or sufentanil (n = 14); neuraxial anesthesia: different doses or modes of administration (continuous vs. single			
administration) (n = 13). Key Question (KQ) 1: In older adults (>50)	years) admitted to the hospital follow	ing acute hip fracture, what is the effectiveness	of pharmacologic and/or
		0 days postfracture) and chronic pain (up to 1	
usual care or other interventions in all sett			
The average baseline VAS pain score was		New Evidence:	
4.7.			
Spinal versus general anesthesia. One RCT			
(n = 30) reported a statistically significant			
difference of additional pain relief in favor			
of spinal anesthesia (MD = -0.86; 95% CI -			
1.30, -0.42; $p = 0.0001$). The strength of the			
evidence was rated as insufficient.			
Neuraxial anesthesia: addition of clonidine,			
fentanyl, meperidine, morphine, or			
sufentanil. Three RCTs compared			
additional fentanyl (n = 40), morphine			
(n = 40), and sufentanil $(n = 50)$ versus			
standard spinal anesthesia. In the studies			
comparing the addition of fentanyl or			
sufentanil, no patients reported feeling pain			
following the procedure. In the study			
comparing the addition of morphine, there			
was no significant difference between			
groups (MD = -0.36; 95% CI -1.11, 0.39; p			

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
= 0.35). One RCT and one nRCT (n = 80) comparing additional fentanyl reported acute pain on day 1 and found no significant difference between groups (OR 1.24; 95% CI 0.34, 4.48; p = 0.75). The strength of the evidence was rated as insufficient.			
	ventions on other outcomes up to 1 ye racture) quantity	ing acute hip fracture, what is the effectiveness ar postfracture compared with usual care or o	
Spinal versus generalanesthesia or spinal versus epidural anesthesia. Two RCTs reported 30-day mortality (n = 99) and found no statistically significant difference in mortality rates (OR 1.73; 95% CI 0.53, 5.68; p = 0.36). In two cohort studies (n = 650), pooling was not performed due to marked statistical heterogeneity and conflicting results between the studies. The strength of the evidence was rated as insufficient. In one RCT (n = 30) that reported delirium there was no significant difference between groups (OR 0.76; 95% CI 0.18, 3.24; p = 0.71). The strength of the evidence was		New Evidence:	

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
rated as insufficient.	cvidence.	tins conclusion.	DO NOT IXIOW
Length of stay (LOS) for acute hospitalization was reported in two RCTs (n = 99). LOS was significantly less in the general anesthesia group (MD 1.69; 95% CI 0.38, 3.01; p = 0.01).		New Evidence:	
Neuraxial anesthesia: addition of clonidine, fentanyl, meperidine, morphine, or sufentanil. Additional pain medication use was reported in six RCTs. In one RCT (n = 40) comparing the addition of lonidine versus standard spinal anesthesia, all participants required additional pain medication. The pooled estimate from three trials examining the addition of fentanyl (n = 102) showed no significant difference between groups (OR 5.51; 95% CI 0.25, 122.08; p = 0.28). There was no significant difference in additional pain medication use in one RCT (n = 40) that compared the addition of morphine (OR 0.27; 95% CI 0.07, 1.04; p = 0.06). Similarly, three RCTs (n = 132) that compared the addition of sufentanil found no difference between groups (Peto's OR 7.39; 95% CI 0.15, 372.38; p = 0.32).		New Evidence:	
Delirium was reported in one RCT (n = 40) comparing the addition of morphine and found no significant difference between groups (OR 3.15; 95% CI 0.12, 82.16; p = 0.49). The strength of the evidence was rated as insufficient.		New Evidence:	

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
Neuraxial anesthesia: different doses and modes of administration (continuous vs. single administration). Three RCTs (n = 163) reported 30-day mortality. In two, there were no deaths. In the third, there was no significant difference between groups (OR 0.46; 95% CI 0.07, 3.02; p = 0.42). Additionally, 30-day mortality was reported in one cohort study (n = 291) that found no significant difference between groups (OR 0.96; 95% CI 0.30, 3.00; p = 0.94). The strength of the evidence was rated as low.		New Evidence:	
Additional pain medication use was reported in two RCTs (n = 134); there were no events in either group.		New Evidence:	
LOS for acute hospitalization was reported in two RCTs (n = 89). There was no significant difference between groups (MD = -0.98 ; 95% CI -2.06 , 0.10; p = 0.07). In two RCTs (n = 134) that reported <i>delirium</i> , there was no significant difference between groups (OR 1.27; 95% CI 0.32, 4.99; p = 0.73). The strength of the evidence was rated as low.		New Evidence:	
Spinal anesthesia (different doses). One cohort study (n = 182) reported that there was no significant difference in 30-day mortality rates between groups (OR 0.49; 95% CI 0.12, 2.02; p = 0.32). The strength of the evidence was rated as insufficient. Another cohort study (n = 60) reported no significant difference in the incidence of delirium (OR 0.46; 95% CI 0.08, 2.75).		New Evidence:	

Conclusions From	Is this conclusion almost certainly still	Has there been new	
CER Executive	supported by the	evidence that may chan	ge
Summary	evidence?	this conclusion?	Do Not Know
			re and frequency of adverse effects that are repostfracture compared with usual care or
other interventions in all settings?	I		
Spinal versus general anesthesia or spinal versus epidural anesthesia. Two RCTs (n = 73) and one cohort study (n = 335) reported adverse effects. Overall, the RCTs reported no significant differences in the occurrence of hypotension, myocardial infarction, or ST segment depression. The cohort study found no difference in the incidence of headaches and hypotension.		New Evidence:	
Neuraxial anesthesia: addition of clonidine, fentanyl, meperidine, morphine, or sufentanil. Eleven RCTs and one nRCT (n = 490) provided data on adverse effects. a. Addition of clonidine. One trial (n = 40) reported no damage to surrounding structures, headaches, or infections. b. Addition of fentanyl. There was no significant difference in the number of participants reporting an allergic reaction in four RCTs (n = 164). There was no significant difference in the number of participants reporting bradycardia in one RCT 6 (n = 42). Seven trials (n = 284) reported the frequency of hypotension. Results were inconsistent across studies and the pooled results are not reported due to		New Evidence:	

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
high heterogeneity. Five trials (n = 204) reported <i>nausea or vomiting</i> and found no significant difference between groups (OR 1.10; 95% CI 0.06, 20.73; p = 0.95). There were no reports of <i>neurological complications</i> in one RCT (n = 40); no reports of <i>respiratory distress</i> in three RCTs (n = 124); no reports of <i>gastrointestinal symptoms</i> in three RCTs (n = 140); and no reports of <i>headaches</i> in one trial (n = 40). c. <i>Addition of meperidine</i> . There were no reports of <i>headaches</i> in one RCT (n = 34). d. <i>Addition of morphine</i> . One RCT (n = 40) reported no significant difference in the number of participants reporting <i>allergic reactions, gastrointestinal symptoms</i> , or <i>nausea or vomiting</i> . e. <i>Addition of sufentanil</i> . There was no significant difference in the incidence of <i>bradycardia</i> in one trial. Three trials (n = 132) reported a significantly lower incidence of <i>hypotension</i> in participants receiving sufentanil (OR = 0.05; 95% CI 0.01, 0.34). In one RCT (n = 42) there were no reports of <i>allergic reaction, nausea or vomiting</i> , or <i>respiratory distress</i> .			
Neuraxial anesthesia: different modes of administration. In one cohort study (n = 291), there were no reports of adverse effects. In one RCT (n = 60) there was no significant difference in the occurrence of gastrointestinal symptoms. In two trials (n = 103) that		New Evidence:	

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
reported on <i>hypotension</i> there was a significant difference between groups in favor of continuous spinal anesthesia (OR 0.12; 95% CI 0.03, 0.51; p = 0.004). Similarly, in one cohort study (n = 291) there was a statistically significant difference in favor of continuous spinal anesthesia (OR 0.08; 95% CI 0.04, 0.14; p < 0.00001). There was no significant difference in <i>myocardial infarction</i> in one trial (n = 29). There was no significant difference in the occurrence <i>ST depression</i> in one trial (n = 29). In one RCT (n = 74) there were no reports of <i>bradycardia</i> , <i>myocardial ischemia</i> , or <i>stroke</i> , and no reports of <i>headache</i> in one trial (n = 60) or one cohort study (n = 291).			
Neuraxial anesthesia: different doses. In one cohort study (n = 182), there were no reports of adverse effects. In one RCT (n = 60) there was no significant difference in the occurrence of allergic reaction for the different doses of bupivacaine. Bradycardia was reported in two trials (n = 120); there was no significant difference among the different doses of bupivacaine or levobupivacaine. Hypotension was reported in four RCTs (n = 190). There was a significant difference following 4mg versus 6mg of bupivacaine (OR 0.03; 95% CI 0.00, 0.58; p = 0.02), but not 5 versus 6mg of bupivacaine (OR 0.31; 95% CI 0.08, 1.13; p = 0.08). Three cohort studies reported hypotension		New Evidence:	

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
(n = 267) and found a significant difference following 2.5 mg versus 5 mg of bupivacaine (OR 0.08; 95% CI 0.03, 0.23; p <0.00001), 4 versus 12 mg of bupivacaine (OR 0.03; 95% CI 0.01, 0.15; p <0.00001), and 0.125 versus 0.5 percent of bupivacaine (OR 0.15; 95% CI 0.03, 0.87; p = 0.03). One cohort study reported a significant difference in the incidence of hypotension following 4 mg versus 12 mg (OR 0.03; 95% CI 0.01, 0.15; p <0.00001), but no difference in the incidence of delirium. There were no reports of nausea or vomiting in two trials (n = 100); no reports of residual sensory deficits or motor weakness, respiratory distress, sedation, or urinary retention in one RCT (n = 60); no reports of gastrointestinal symptoms in two trials (n = 100); and no reports of headache in one cohort study (n = 182).			
		ng acute hip fracture, how do the effectiveness ons following acute hip fracture up to 1 year af New Evidence:	
Complementary and Alternative Me	edicine	New Evidence.	
Two RCTs (n = 98) evaluated the administration of CAM interventions versus no or sham intervention. The mean age ranged from 76.8 to 86.3 years; most were female. One trial (n = 38) compared acupressure versus sham control delivered		New Evidence:	

preoperatively. Acute pain was measured using the 10cm VAS; the baseline measure was 6.5cm. The second trial (n = 60) compared the Jacobson relaxation technique (a two-step process of contracting and relaxing specific muscles) versus no intervention. Pain was measured using a 10-point verbal scale; the baseline measure was
using the 10cm VAS; the baseline measure was 6.5cm. The second trial (n = 60) compared the Jacobson relaxation technique (a two-step process of contracting and relaxing specific muscles) versus no intervention. Pain was measured using a 10-
was 6.5cm. The second trial (n = 60) compared the Jacobson relaxation technique (a two-step process of contracting and relaxing specific muscles) versus no intervention. Pain was measured using a 10-
compared the Jacobson relaxation technique (a two-step process of contracting and relaxing specific muscles) versus no intervention. Pain was measured using a 10-
(a two-step process of contracting and relaxing specific muscles) versus no intervention. Pain was measured using a 10-
relaxing specific muscles) versus no intervention. Pain was measured using a 10-
intervention. Pain was measured using a 10-
not reported.
Key Question (KQ) 1: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or
nonpharmacologic pain management interventions for controlling acute (up to 30 days postfracture) and chronic pain (up to 1 year postfracture) compared with
usual care or other interventions in all settings?
Acupressure reduced pain versus a sham New Evidence:
intervention (MD -3.01; 95% CI -4.53, -
1.49; p <0.0001). Relaxation also showed a
reduction in pain versus no relaxation (MD
-1.10; 95% CI -1.43, -0.77; p <0.00001).
The strength of the evidence was rated as
insufficient.
Key Question (KQ) 2: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or
nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings?
Other outcomes include:
a. Mortality (30-day and up to 1 year postfracture) b. Functional status
c. Pain medication use; change in type and quantity d. Mental status
e. Health-related quality of life
f. Quality of sleep in the hospital
g. Ability to participate in rehabilitation
h. Return to prefracture living arrangements
i. Health services utilization
In the RCT that examined relaxation, fewer New Evidence:
patients in the relaxation group required

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
additional pain medication (e.g., meperidine or morphine) versus the control group (MD -8.43; 95% CI -15.11, -1.75; p = 0.01).			
		ving acute hip fracture, what is the nature and f n management interventions up to 1 year postfi	
No data were reported.		New Evidence:	
		ring acute hip fracture, how do the effectiveness ions following acute hip fracture up to 1 year a	
No data were reported.		New Evidence:	
Multimodal Pain Management			
Two cohort studies (n = 226) evaluated multimodal pain management versus standard care. These studies described the use of multiple pain management strategies (sequential or in parallel) as part of the clinical pathway for patients with hip fractures. The mean age was not reported; most participants were female. One study compared a formal postoperative protocol of IV and oral tramadol plus acetaminophen versus standard care. The second compared a formal preoperative protocol of skin traction, morphine and acetaminophen versus standard care.		New Evidence:	

Key Question (KQ) 1: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions for controlling acute (up to 30 days postfracture) and chronic pain (up to 1 year postfracture) compared with

Conclusions From	Is this conclusion almost certainly still	Has there been new	
CER Executive	· ·		
	supported by the	evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
usual care or other interventions in all sett	ings?		
XI I .		TV DO	
No data were reported.		New Evidence:	
Key Question (KQ) 2: In older adults (≥50	years) admitted to the hospital follow	ving acute hip fracture, what is the effectiven	ess of pharmacologic and/or
	ventions on other outcomes up to 1 years	ear postfracture compared with usual care o	r other interventions in all settings?
Other outcomes include:			
a. Mortality (30-day and up to 1 year posts	fracture)		
b. Functional status			
c. Pain medication use; change in type and	quantity		
d. Mental status			
e. Health-related quality of life			
f. Quality of sleep in the hospital			
g. Ability to participate in rehabilitation			
h. Return to prefracture living arrangement	nts		
i. Health services utilization	T.	Dr. B. (1	
Mortality was reported in one study (n =		New Evidence:	
106). There was no significant difference			
between groups after 30 days (OR 0.54;			
95% CI 0.16, 1.77; $p = 0.31$), or at 1 year			
(OR 0.60; 95% CI 0.25, 1.47; p = 0.26).			
Both studies reported <i>delirium</i> and found no			
significant difference between groups. The			
strength of the evidence for both outcomes			
was rated as insufficient.			10 01 00 4 41 4
		ving acute hip fracture, what is the nature an	
other interventions in all settings?	macologic and nonpharmacologic par	n management interventions up to 1 year pos	suracture compared with usual care or
Data were reported in one study (n = 106).		New Evidence:	
There were no significant differences		New Evidence.	
between groups.			

Is this conclusion **Conclusions From** almost certainly still Has there been new **CER Executive** supported by the evidence that may change Summary evidence? this conclusion? Do Not Know Key Question (KQ 4): In older adults (≥50 years) admitted to the hospital following acute hip fracture, how do the effectiveness and safety of pharmacologic and nonpharmacologic pain management interventions vary in differing subpopulations following acute hip fracture up to 1 year after fracture compared with usual care or other interventions in all settings? No data were reported. New Evidence: **Nerve Blocks** Twenty-nine RCTs (n = 1,757) evaluated New Evidence: nerve blocks, including 3-in-1 (neurostimulation [NS]/ultrasoundguided [US]), combined lumbar/sacral plexus, fascia iliaca compartment, femoral, lumbar plexus plus sciatic nerve, posterior lumbar plexus, psoas compartment, obutarator, and epidural nerve blocks. These were compared with placebo/standard care, or a different method of nerve blocks. Additionally, three cohort studies (n = 696)evaluated 3-in-1, femoral, and lumbar plexus plus sciatic nerve blocks versus analgesia, or comparing different analgesic medications in femoral lumbar plexus plus sciatic blocks. The mean age of participants ranged from 59.2 to 85.9 years; most were female. Acute pain was measured using different scales (i.e., numeric rating scales and 10cm VAS). Eight studies using the VAS reported mean baseline scores from 1.4cm to 7.3cm. The studies were grouped as follows: nerve blocks versus standard care/placebo; nerve blocks versus neuraxial anesthesia; nerve blocks-ropivacaine versus

bupivacaine; nerve blocks-addition of

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Conclusions From	Is this conclusion almost certainly still	Has there been new	
CER Executive	supported by the	evidence that may change	
		· ·	
Summary	evidence?	this conclusion?	Do Not Know
clonidine; and nerve blocks–ultrasound versus neurostimulation.			
Key Question (KQ) 1: In older adults (≥50	years) admitted to the hospital follow	ing acute hip fracture, what is the effectiveness	of pharmacologic and/or
		30 days postfracture) and chronic pain (up to 1	
usual care or other interventions in all sett	ings?		• •
Research on very young children is		New Evidence:	
preliminary, with four studies identified.			
One good-quality RCT suggested benefit			
from the use of ESDM in young children,			
with improvements in adaptive behavior,			
language, and cognitive outcomes.			
Diagnostic shifts within the autism			
spectrum were reported in close to 30			
percent of children but were not associated			
with clinically significant improvements in			
ADOS severity scores or other measures.			
		ing acute hip fracture, what is the effectiveness	
	ventions on other outcomes up to $f 1$ ye	ear postfracture compared with usual care or o	ther interventions in all settings?
Other outcomes include:			
a. Mortality (30-day and up to 1 year post	racture)		
b. Functional status			
c. Pain medication use; change in type and	quantity		
d. Mental status			
e. Health-related quality of life			
f. Quality of sleep in the hospital			
g. Ability to participate in rehabilitation	- 4 -		
h. Return to prefracture living arrangements. Health services utilization	nts		
Nerve blocks versus no block.	T	New Evidence:	
Four RCTs ($n = 228$) evaluated 30-day		New Evidence.	
mortality; there was no significant			
difference between groups (OR 0.28; 95%			
CI 0.07, 1.12; $p = 0.07$). The strength of the			
C1 0.07, 1.12, p = 0.07). The suchgui of the			

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
evidence was rated as low. There was no significant difference in 1-year mortality in two RCTs (n = 112) (OR 0.82; 95% CI 0.25, 2.72; p = 0.74), or in one cohort study (n = 535) (OR 0.73; 95% CI 0.48, 1.10; p = 0.14). Seven RCTs (n = 378) evaluated additional pain medication use and found a significant difference favoring nerve blocks (OR 0.32; 95% CI 0.14, 0.72; p = 0.006). Similarly, one cohort study (n = 99) reported a significant difference favoring nerve blocks (OR 0.03; 95% CI 0.00, 0.44; p = 0.01). Pooled results for four RCTs (n = 461) and two cohort studies (n = 634) that provided data on delirium showed a significant difference favoring nerve blocks (OR 0.33; 95% CI 0.16, 0.66; p = 0.002 [RCTs]; OR 0.24; 95% CI 0.08, 0.72; p = 0.01[cohort studies]). The strength of the evidence was rated as moderate. LOS for acute hospitalization (days) was reported in two cohort studies (n = 634), but the pooled results are not reported due to marked heterogeneity between the original study results. Quality of sleep was reported in one RCT (n = 77) that found no significant			
difference (MD 0.30; 95% CI -0.46, 1.06; p			
= 0.44). Nerve blocks versus neuraxial anesthesia.		New Evidence:	
Additional pain medication use was reported in one RCT (n=30); there was no significant difference between groups (OR 2.00; 95% CI 0.38, 10.51; p = 0.41). Delirium was reported in one RCT (n = 29);		New Evidence:	

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
there was no significant difference between groups (OR 1.20; 95% CI 0.27, 5.40; p = 0.81). The strength of the evidence was rated as insufficient.			
Ropivacaine versus bupivacaine. Additional pain medication use and delirium were reported in one cohort study (n=62). There		New Evidence:	
was no significant difference between groups for either outcome (OR 1.25; 95% CI 0.42, 3.76; p=0.69; OR 1.93; 95% CI 0.17, 22.50; p=0.60, respectively). The			
strength of the evidence for delirium was rated as insufficient. Key Overstein (KO3): In older adults (>50)	years) admitted to the hespital follow	ring acute hip fracture, what is the nature and	frequency of adverse effects that are
		n management interventions up to 1 year postf	
other interventions in all settings?	mmeorogie und nomphurmmeorogie pur	in management interventions up to 1 year posts	ructure compared with asuar care or
Nerve blocks versus no block.		New Evidence:	
Respiratory infection was reported in five			
RCTs (n=268) and found no significant			
difference (OR 0.43; 95% CI 0.18, 1.04;			
p=0.06). There were no significant			
differences between groups for the			
following adverse effects: cardiac			
complications (2 RCTs, n=128; 1 cohort			
study, n=99); damage to surrounding			
structures (3 RCTs, n=224); deep venous			
thrombosis (2 RCTs, n=100); myocardial			
infarction (2 RCTs, n=145; 1 cohort study,			
n=535); nausea/vomiting (6 RCTs, n =			
421); pulmonary embolism (2 RCTs, n =			
128); surgical wound infection (2 RCTs, n			
= 110); <i>urinary retention</i> (2 RCTs, n = 62;			
1 cohort study, $n = 535$). There were no reports of infection in two			
There were no reports of fillection in two			

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know
RCTs (n = 184). The remaining reported adverse effects were from single studies and did not demonstrate any significant statistical differences between the pain management interventions.			
Nerve blocks versus neuraxial anesthesia, ropivacaine versus bupivacaine and addition of clonidine. The reported adverse effects were from single studies and did not demonstrate any significant statistical differences between the pain management interventions.		New Evidence:	
US versus NS. Two RCTs (n = 100) reported no significant difference in damage to surrounding structures (OR 0.16; 95% CI 0.02, 1.30; p = 0.09). The remaining reported adverse effects were from single studies and did not demonstrate any significant statistical differences between the pain management interventions.		New Evidence:	
		ving acute hip fracture, how do the effectiveness ions following acute hip fracture up to 1 year a	
One RCT recruited patients with pre- existing heart disease. There was a significant reduction in pain favoring nerve blocks (MD -0.55; -0.81, -0.29; p <0.0001). There was no significant difference in 30- day mortality (OR 0.10; 95% CI 0.01, 1.90; p = 0.12) or adverse effects. One RCT recruited participants that were independent prior to their hip fracture. There was no significant difference between nerve blocks		New Evidence:	

	T			
Conclusions From	Is this conclusion			
Conclusions From	almost certainly still	Has there been new		
CER Executive	supported by the	evidence that may change		
Summary	evidence?	this conclusion?	Do Not Know	
· ·	evidence:	this conclusion.	DO NOU KIIOW	
versus standard care for 30-day mortality (OR 1.00; 95% CI 0.06, 16.76; $p = 1.00$).				
Neurostimulation				
Two RCTs $(n = 123)$ evaluated		New Evidence:		
transcutaneous electrical neurostimulation				
(TENS) versus sham control. One trial				
administered the TENS preoperatively, and				
the other postoperatively. The mean age of				
participants ranged from 71.2 to 80.5 years;				
most were female. Pain was measured using				
the VAS; the mean baseline measure was				
8.4 to 8.8.				
		ing acute hip fracture, what is the effectiveness		
		80 days postfracture) and chronic pain (up to 1	year postfracture) compared with	
usual care or other interventions in all setti	ings:	New Evidence:		
Two RCTs (n = 123) found a significant difference in additional pain relief in favor		New Evidence:		
of TENS (MD -2.79; 95% CI -4.95, -0.64; p				
= 0.01). Pain on movement was reported in				
one trial ($n = 60$) and found a significant				
difference in favor or TENS (MD -3.90;				
95% CI -6.22, -1.58; $p = 0.001$). The				
strength of the evidence was rated as				
insufficient.				
Key Question (KQ) 2: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or				
nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings?				
Other outcomes include:				
a. Mortality (30-day and up to 1 year postfracture)				
b. Functional status				
c. Pain medication use; change in type and quantity				
d. Mental status				
e. Health-related quality of life				

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change		
Summary	evidence?	this conclusion?	Do Not Know	
f. Quality of sleep in the hospital g. Ability to participate in rehabilitation h. Return to prefracture living arrangeme i. Health services utilization	nts			
One RCT ($n = 60$) provided data on <i>health</i> -		New Evidence:		
related quality of life (HRQOL) and quality of sleep. TENS provided significant improvement in HRQOL (MD -4.30; 95% CI -6.86, -1.74; p = 0.001) and quality of sleep (MD -3.60; 95% CI -575, -1.45; p = 0.001).				
		ving acute hip fracture, what is the nature and		
	macologic and nonpharmacologic pai	n management interventions up to 1 year postf	racture compared with usual care or	
other interventions in all settings?		Nam Eridanaa		
No data were reported.		New Evidence:		
Key Question (KQ 4): In older adults (≥50 years) admitted to the hospital following acute hip fracture, how do the effectiveness and safety of pharmacologic and nonpharmacologic pain management interventions vary in differing subpopulations following acute hip fracture up to 1 year after fracture compared with usual care or other interventions in all settings?				
No data were reported.		New Evidence:		
Rehabilitation				
One RCT (n = 37) evaluated physical therapy (stretching and strengthening of spinal and psoas muscles) versus standard care. The mean age was 67.1; all participants were female. Pain was measured using the 10cm VAS; the mean baseline measure was 7.9cm.		New Evidence:		
Key Question (KQ) 1: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions for controlling acute (up to 30 days postfracture) and chronic pain (up to 1 year postfracture) compared with				

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	evidence that may char	S	
Summary	evidence?	this conclusion?	Do Not Know	
usual care or other interventions in all setti	ings?			
There was a significant difference in		New Evidence:		
additional pain relief following physical				
therapy (MD -1.39; 95% CI -2.27, -0.51; p				
= 0.002). The strength of the evidence was				
rated as insufficient.				
Key Question (KQ) 2: In older adults (≥50				
nonpharmacologic pain management inter Other outcomes include:	ventions on other outcomes up to	i year postiracture compared with usual ca	are or other interventions in all settings:	
a. Mortality (30-day and up to 1 year postf	ractura)			
b. Functional status	racture)			
c. Pain medication use; change in type and	auantity			
d. Mental status	quantity			
e. Health-related quality of life				
f. Quality of sleep in the hospital				
g. Ability to participate in rehabilitation				
h. Return to prefracture living arrangemen	nts			
i. Health services utilization				
No other outcomes were reported.		New Evidence:		
Key Question (KQ 3): In older adults (≥50	years) admitted to the hospital fo	lowing acute hip fracture, what is the natu	re and frequency of adverse effects that are	
directly or indirectly associated with pharm	nacologic and nonpharmacologic	pain management interventions up to 1 yea	r postfracture compared with usual care or	
other interventions in all settings?				
No data were reported.		New Evidence:		
Key Question (KQ 4): In older adults (≥50 years) admitted to the hospital following acute hip fracture, how do the effectiveness and safety of pharmacologic and				
nonpharmacologic pain management inter				
care or other interventions in all settings?	, and grant P	S r	<u> </u>	
All participants were female.		New Evidence:		

Conclusions From CER Executive Summary	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know	
Traction				
Nine RCTs, four nRCTs, and one cohort study evaluated skin or skeletal traction versus no intervention or other interventions. Sample sizes ranged from 60 to 311. The mean age ranged from 74.0 to 81.0; most participants were female.		New Evidence:		
	ventions for controlling acute (up to 3	ving acute hip fracture, what is the effectiveness 30 days postfracture) and chronic pain (up to 1		
Acute pain was measured using the 10cm VAS; the mean baseline measure ranged from 0.3 to 6.9cm. Eight trials compared skin traction (n = 498) versus no traction (n = 594) and found no significant difference between groups. The strength of the evidence was rated as low. One trial (n = 78) compared skin traction versus skeletal traction and found no difference between groups. The strength of the evidence was rated as insufficient.		New Evidence:		
Key Question (KQ) 2: In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the effectiveness of pharmacologic and/or nonpharmacologic pain management interventions on other outcomes up to 1 year postfracture compared with usual care or other interventions in all settings? Other outcomes include: a. Mortality (30-day and up to 1 year postfracture) b. Functional status c. Pain medication use; change in type and quantity d. Mental status e. Health-related quality of life f. Quality of sleep in the hospital g. Ability to participate in rehabilitation h. Return to prefracture living arrangements				

Conclusions From CER Executive Summary i. Health services utilization	Is this conclusion almost certainly still supported by the evidence?	Has there been new evidence that may change this conclusion?	Do Not Know	
LOS for acute hospitalization was reported in two trials (n = 326) comparing skin traction versus no traction and no significant difference was found. Thirty-day mortality was reported in one RCT (n = 80) that found no difference between skin and skeletal traction versus no traction. Additional pain medication use was reported in one RCT and one nRCT (n = 352). There was no significant difference between groups.		New Evidence:		
Key Question (KQ 3): In older adults (≥50 years) admitted to the hospital following acute hip fracture, what is the nature and frequency of adverse effects that are directly or indirectly associated with pharmacologic and nonpharmacologic pain management interventions up to 1 year postfracture compared with usual care or other interventions in all settings?				
Seven RCTs (n = 1,043) and one cohort study (n = 134) provided data on adverse effects. The reported adverse effects were from one to two studies, and did not demonstrate any significant statistical differences between the pain management interventions.		New Evidence:		
Key Question (KQ 4): In older adults (≥50 years) admitted to the hospital following acute hip fracture, how do the effectiveness and safety of pharmacologic and nonpharmacologic pain management interventions vary in differing subpopulations following acute hip fracture up to 1 year after fracture compared with usual care or other interventions in all settings?				
No data were reported.		New Evidence:		
Are there new data that could inform the key questions that might not be addressed in the conclusions?				

Conclusions From CER Executive	Is this conclusion almost certainly still supported by the	Has there been new evidence that may change	
Summary	evidence?	this conclusion?	Do Not Know
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